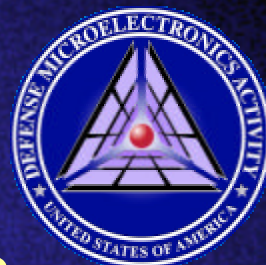




Office of the Secretary of Defense



DoD DMS Initiatives

Support for the Warfighter

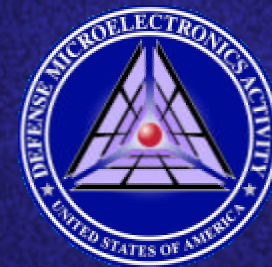
Doug Casanova
Chief, Microelectronics Int Br
Defense Microelectronics Activity
DUSD(L&MR) / DMEA

Phone: (916) 231-1550, Fax: (916) 231-2850
email: casanova@dmea.osd.mil
<http://www.dmea.osd.mil>

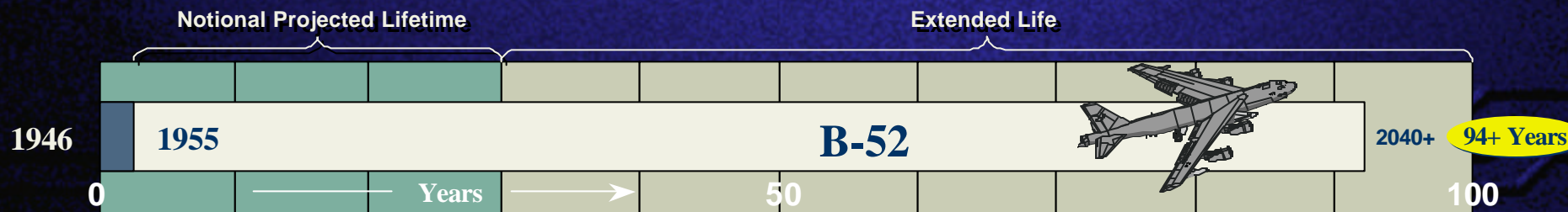




DoD Challenges

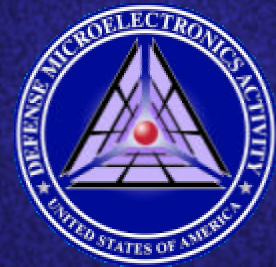


- Increased use / reliance on microelectronics (“Smart” weapon systems)
 - Strategic, tactical, C4I
 - Critical DoD Technology
- Decreased stability
 - Dynamic development drives obsolescence cycles of 18 months or less
 - Over 95% of all DoD DMS cases are microelectronics
- Increased weapon life cycles
 - “older” technology
 - Many 5 volt
 - Little / no data



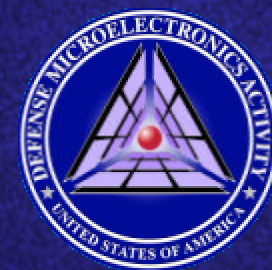


DoD Challenges

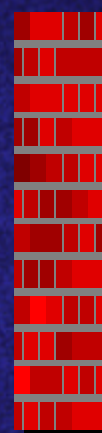
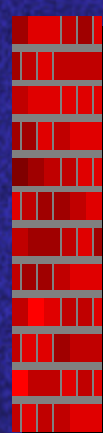
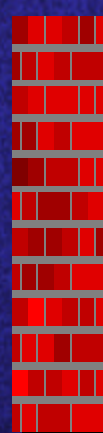
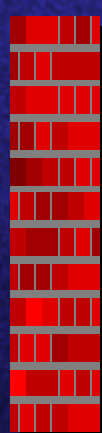
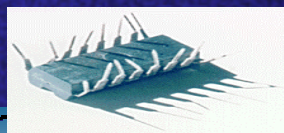


- Commercial market (COTS) drives the technology
 - Quick turns
 - Very high volumes
 - Lower voltage devices
 - Capacity restrained
 - Motivation is profit, competitive advantage, and market share
- DoD / Defense Industry has the same problem
 - DoD / Defense Industry's total market share now $<0.3\%$
 - Defense Needs: Critical Technology required in low volume for long terms
 - Market Reality: Availability only for very short periods to high volume customers
 - Result: No products / No leverage





Common Problem

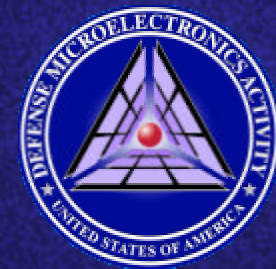


Unique Solutions

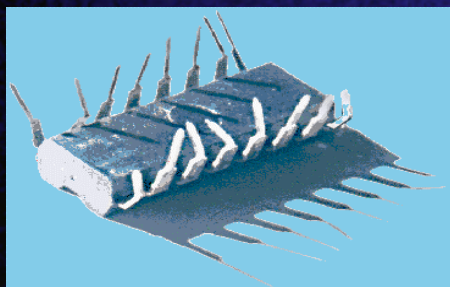
High Operation & Support Costs \$\$\$\$

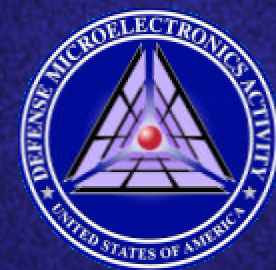


DMEA Mission



- Established by Secretary of Defense
- DoD mission - Directly reports to the Deputy Under Secretary of Defense Logistics & Materiel Readiness
- Provide microelectronics technology solutions
 - DoD / government
 - Industry / foreign allies
 - Leverage new advanced microelectronics technologies to improve Capability, Performance and Reliability
 - Reduce effects of rapid obsolescence
 - Assigned as DoD Executive Agent for microelectronics DMS
 - Coordinate activities
 - Develop OSD policy and strategy





**Secretary of Defense
DoD**



**Under Secretary of Defense for
Acquisition, Technology & Logistics
USD(A,T, & L)**



**Deputy Under Secretary of
Defense for Logistics & Materiel Readiness
DUSD(L & MR)**



**Defense MicroElectronics Activity
DMEA**



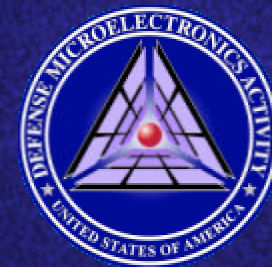
**DoD Working
Group**



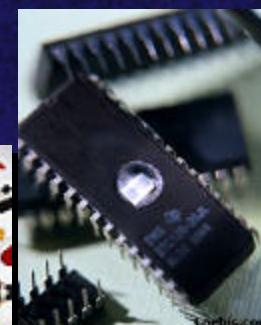
**DoD Teaming
Group**



Old Solution Strategies “Reactive”



- “Typical” old solutions not time / cost effective
 - Life-of-type buys = 100% error
 - Buy too little or too much
 - Opposite of modern business philosophy
 - Just enough / Just in time
 - Minimum cash output
 - Technical solutions without a valid business solution
 - Time / expense to create solution that may soon go obsolete as well



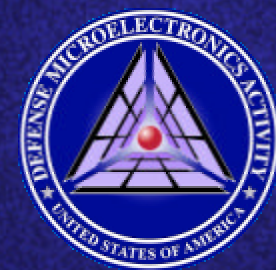


DMEA Solution Strategy “Proactive”



- Solutions must include the reality of Commercial Market
 - Obsolescence is a business decision
- Technical solutions must have a valid business model
 - Technically correct
 - Commercially viable
 - Flexes with the market
 - Ensure long term requirement

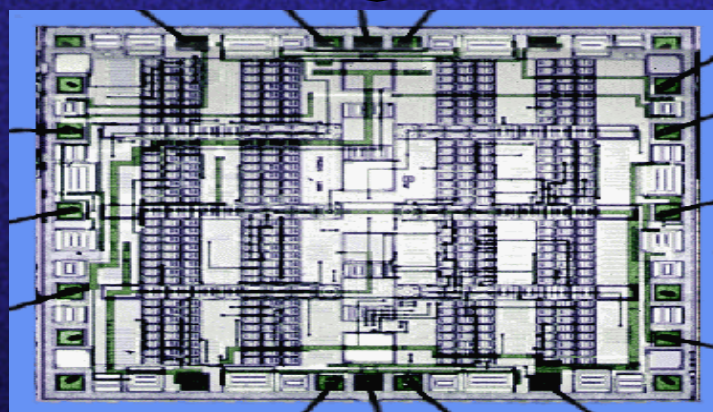




Common Solutions



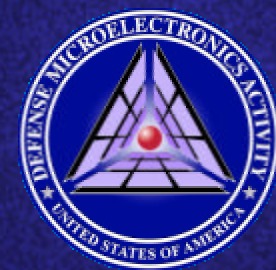
"old"
process



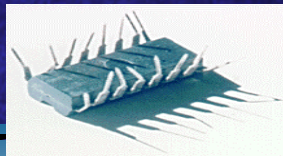
"New"
process

•Technically correct

•Commercially viable



Common Problem

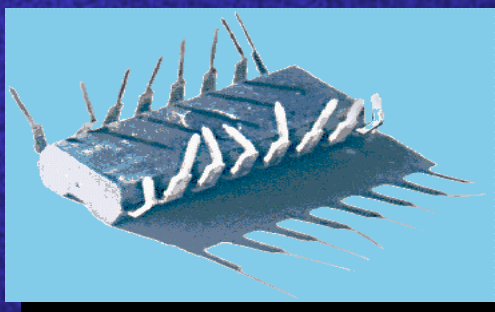
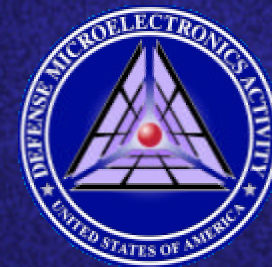


Common Solution

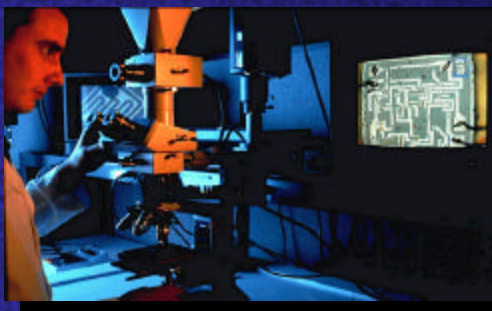
Dramatically decreases O&S costs!



DoD / DMEA Engineering Capabilities



Obsolete Chip



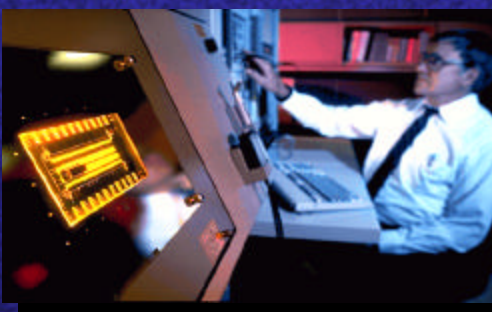
Reverse Engineering
and Analysis



Design/Simulation



Prototype



Test



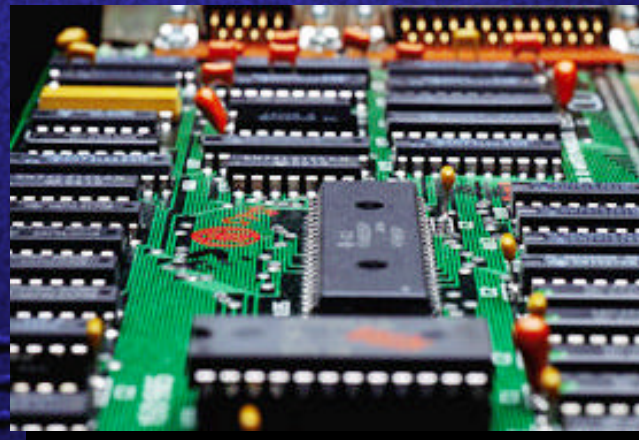
New Microcircuit

- **Recreate data**
- **Breaks Government / Industry Deadlock**
- **Reestablish industry incentive**
- **Lowers Operation & Support (O&S) costs**
- **Apply sound technical and business principles for a total solution**



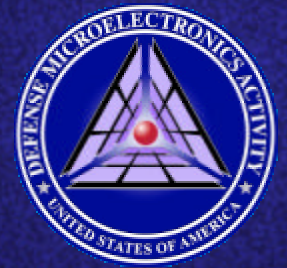
Advanced Technology Insertions

- Advanced microelectronics capabilities provide new solution opportunities
- Technology Compression
 - Solves multiple problems with one solution
 - Increased savings
- Innovative technology leverage advantage
 - Reduced O & S cost
 - Increased capability

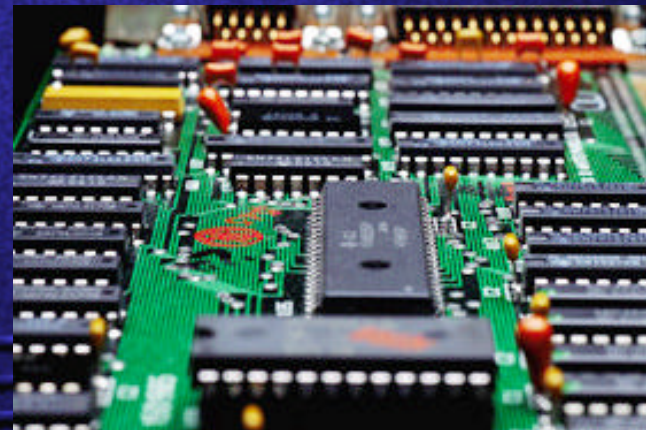




Total Solution Program

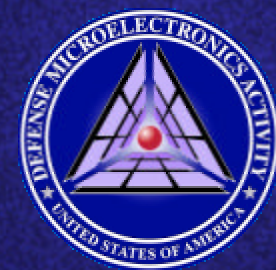


- Verify Problems
 - Analyze
 - Reverse Engineer, if necessary
 - Consolidate requirements with other programs
- Develop Solution Options
 - Component
 - Aftermarket
 - Emulation
 - Custom
 - Licensed Replacement
 - Board / Box / System
 - Technology Compression Savings
 - Increased capability
- Best value
- Smart Procurement





DMEA / Industry



➤ More than one “industry”

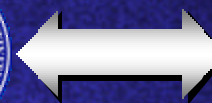
Aftermarket ● Defense ● Semiconductor

➤ Each deals with microelectronics issues, but ...

- Different issues for each industry
- Different motivations
- Different business models

➤ Different partnerships for different industries

- DMEA created specific partnerships for specific industries
- Each partnership combines unique technical approach with unique business models



Semiconductor



Defense

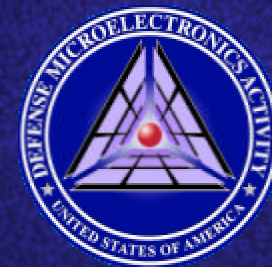


After-Market





Aftermarket Industry Partnerships

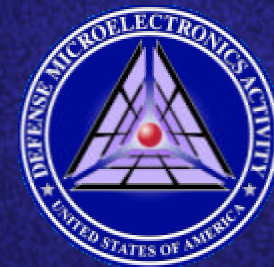


- Integrated part of DMEA's set of solutions
 - Quick
 - Inexpensive
- Cooperative ventures established between DMEA / Industry
 - DMEA unique resources utilized to increase industry's inventory viability
 - Industry resources used by DMEA for packaging / testing die
- Win / Win for Industry and DoD
 - Increased use of in-place inventory = increased profits
 - Increased viability of in-place inventory = quicker / cheaper solutions for warfighter

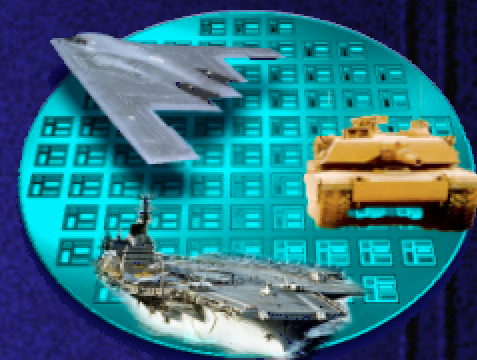




Defense Industry Partnerships



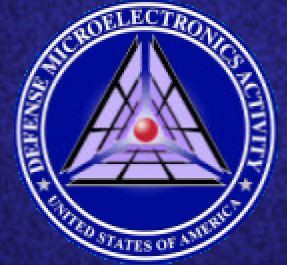
- Team approach to solve warfighters problems
 - OEM expertise
 - DMEA's government unique capability / program
- ATSP (Advanced Technology Support Program)
 - Instant access to major defense primes (23 days)
 - Access to overseas in-country assets
 - Leveraged resources / leveraged solutions
- New cooperative initiatives
 - Industry access to DMEA capability
 - Only realistic approach to microelectronics problems
- Lower industry costs \Rightarrow lower government costs
 - DMEA key





DMEA's "Flexible Foundry"

A new solution strategy for the 21st Century

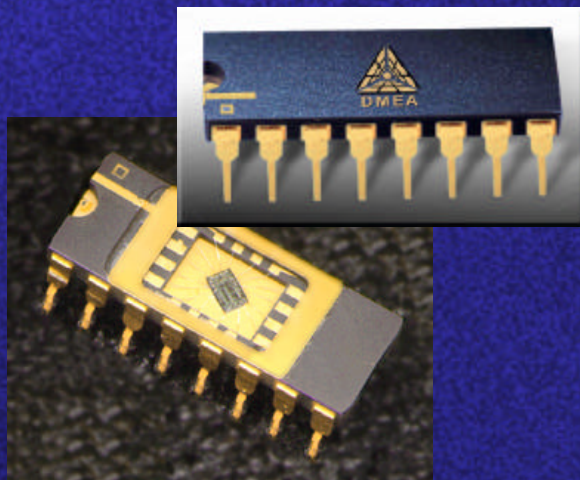
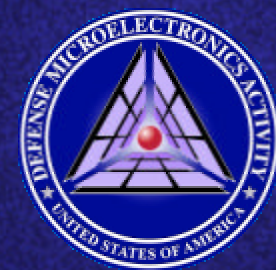


- Government / Semiconductor Industry partnership
 - New Flex Foundry technology
 - New business model
- Government-held process licenses
 - No commercial conflicts
 - Prototype / low volume production by DMEA
 - High volume production by industry
- Terminal transfer to DMEA upon OEM business decision
 - Transfers industry-developed (commercial) technology
 - Replacement ensured (including 5 Volt)
- Multiple licenses - multiple products
- New process licenses added continually
- Ensures continued DoD supply as industry flexes with market
- Just enough and Just in time (inventory & \$)





DMEA's Flexible Foundry (Multiple Processes)

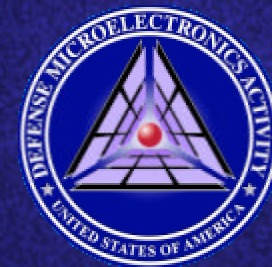


- Flexible Foundry:
 - Multiple Processes / Multiple Devices vs. Single Processes / Multiple Devices
- One foundry process severely limited (sub optimized)



DoD / Industry Partnership

Together Supporting the Warfighter

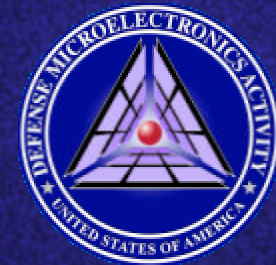


- Boeing / F-22 hybrid obsolescence problem
- Requested DMEA's Flexible Foundry Support
- Solution – DMEA & Boeing CRADA
 - DMEA / Boeing working together on developing new IC
 - DMEA to provide design engineering
 - DMEA to fabricate and test new IC
 - Flex Foundry – Intersil EBHF Process
 - Prototype Fabrication March 2001

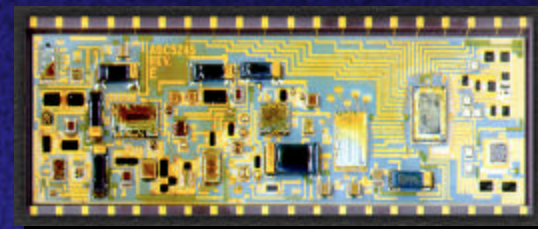




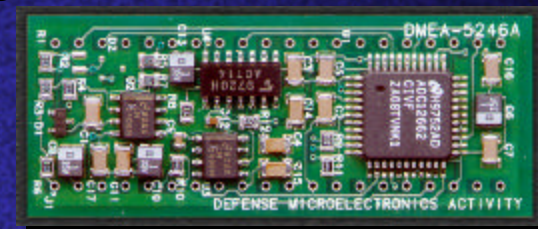
CCS MK-2 Fire Control System



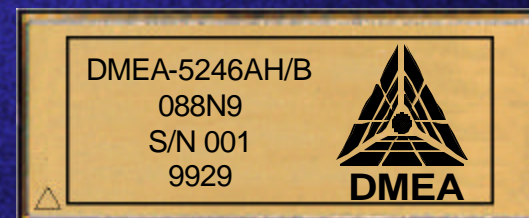
- Customer
 - US Navy (NUWC-Keyport)
- Problem
 - Device not available
 - Device required for production of Synchro-Resolver I/O Circuit Card Assembly (CCA)
- Solution
 - Advanced Technology FFF Replacement
- Benefit
 - Device now available for repair actions
 - Avoided costly redesign & testing of circuit card



Original 1MHz, 12 bit A/D Converter



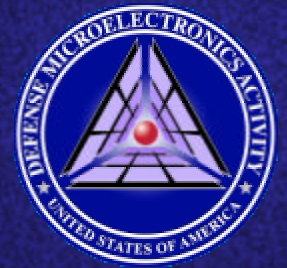
Engineering Prototype



Production Unit

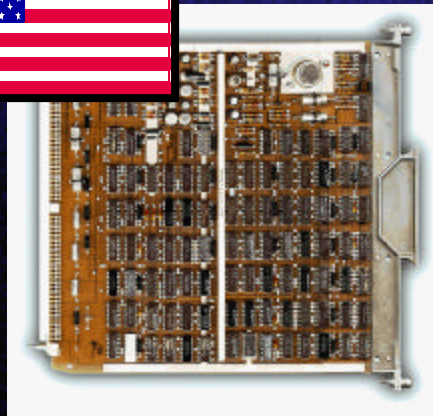
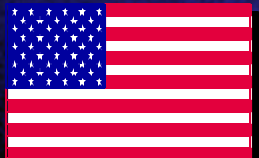


Multi-National Project

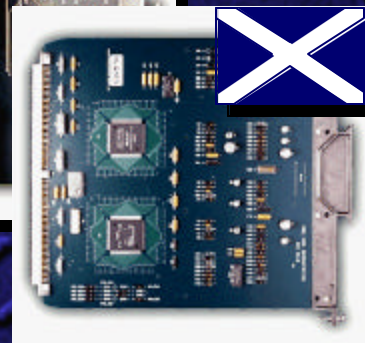
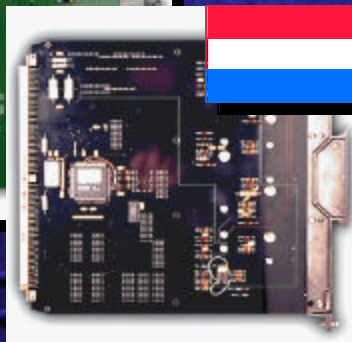
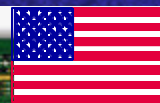


**NATO
Multiple Launch Rocket System**

- Cooperative R & D Program
- Purpose → Demonstrate viability of VHDL as an International Standard
 - DMEA designed, fabricated, and tested MLRS board using VHDL
 - Multi-national participants successfully synthesized, fabricated, and tested board
- Results → Successful testing of all boards at NATO MLRS test facility NAMSA, Luxembourg



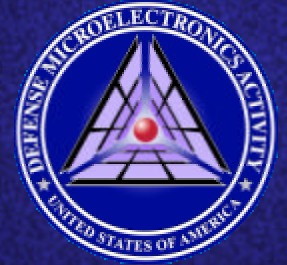
Original MLRS module



Redesigned MLRS modules

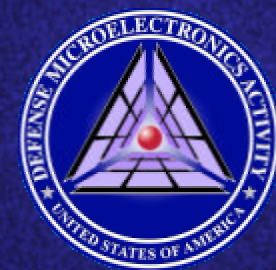


DMEA B2 Support



- B2 obsolescence support
 - Obsolete microelectronics impacting B2 aircraft
 - Assessment
 - Solution strategies
 - Reverse engineering
 - Solution design, prototype, and test
 - DMEA tasked to solve Defensive Management System (Avionics Subsystem) problems
 - Cost avoidance = \$32 Million





International Interest

- United Kingdom Ministry of Defence

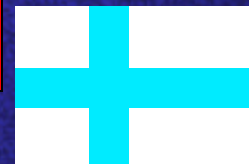


- BAE Systems

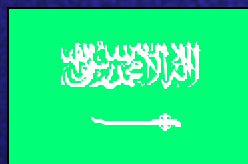
- ASELSAN Inc.



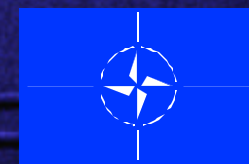
- Canada & Finland / US Navy



- Saudi Arabia - FMS

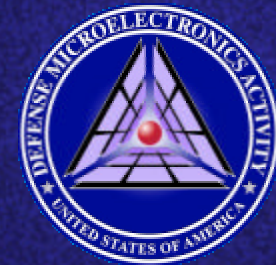


- NATO Maintenance & Supply Agency (NAMSA)





DMEA Leveraged Solutions



Program Offices



B-2



AEGIS

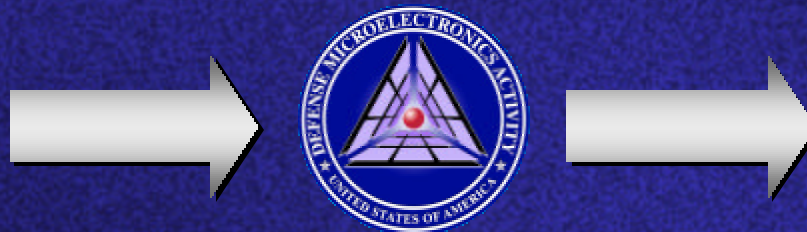


M1A2 Abrams



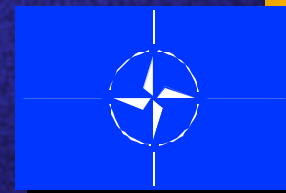
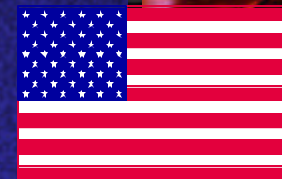
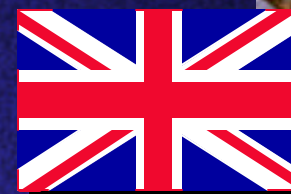
Nimrod

- *Unique Expertise*
- **Unique Capability**



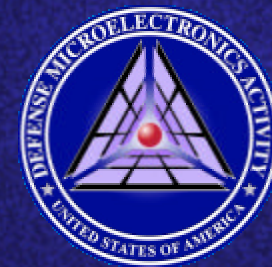
- **Consolidated Requirements**
- **Leveraged solutions**
 - **Technically correct**
 - **Economically viable**

Total Program





Summary



- Unique DoD challenges
 - Increased reliance on critical technology
 - Decreased market leverage
- DoD / Industry partnerships
 - Leverage DMEA / defense industry requirements / capabilities
 - Utilize DMEA / aftermarket resources to increase valid supply
 - License and transition OEM lines to DMEA's Flex Foundry
- Leveraged technical / business solutions
 - Recognizes commercial lead, pace, and profit incentives
 - Practical long term solution strategy



Support For The Warfighter !

Total Program / Leveraged Solutions / Best Value / Smart Procurement